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October 20, 2008

277085.64.00.01/MID3.1500

Mr. Henry Chui
California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721

**Subject: Final Sampling and Analysis Plan for Investigation of Black Granular Material
and Organochlorine Pesticides in Soil at Building 84, Investigation Area D1.3**

Dear Mr. Chui:

This letter presents the final sampling and analysis methodology for investigation of organochlorine pesticides (OCPs) and lead associated with black granular material (BGM) in soil at Building 84, Investigation Area (IA) D1.3, Early Eastern Transfer Parcel, Mare Island, California. This investigation has been developed in accordance with the Consent Agreement between Lennar Mare Island, LLC; the City of Vallejo; and the State of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) (LMI et al. 2001) and comments on the Draft Sampling and Analysis Plan (Draft SAP) provided by the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) in a letter dated September 30, 2008 (CH2M HILL 2008a; Water Board 2008a). Responses to Water Board comments are presented as Attachment 1. The DTSC had no comment on the Draft SAP (DTSC 2008).

The sampling procedures and protocols that will be used during implementation of this investigation are based on those documented in the *Draft Investigation Area C2 Sampling and Analysis Plan* (CH2M HILL 2002), *Final Generic Sampling and Analysis Plan for Lead-based Paint and Pesticides* (CH2M HILL 2003a), and as modified based on site-specific field conditions.

During actions associated with implementation of *Notification Regarding Self-Implementing Onsite Cleanup and Disposal of Polychlorinated Biphenyl Remediation Waste Inside Building 84 in Investigation Area D1.3, Eastern Early Transfer Parcel, Mare Island, Vallejo, California* (CH2M HILL 2003b), CH2M HILL discovered black granular material (BGM) immediately beneath the concrete and asphalt floor of the building. Additionally, during the laboratory analysis for polychlorinated biphenyls (PCBs) in soil verification samples collected during site cleanup activities, CH2M HILL was notified by the analytical laboratory of interferences on PCB soil sample chromatograms. According to the laboratory, these interferences indicated the potential presence of chlorinated pesticides in the samples.

CH2M HILL presented DTSC with an overview of these environmental conditions during a meeting on August 14, 2007. During the August 14, 2007 meeting, DTSC requested additional characterization of OCPs and lead in soil at the site to evaluate the lateral extent of OCPs and lead beyond the footprint of Building 84. Additional background information and the proposed investigation sampling strategy are presented in the sections below.

Background

Building 84 is located west of Suisun Avenue and south of Mesa Road within IA D1.3. Building 84 was built in 1890 and was used as the United States Marine prison. The *Preliminary Reuse Plan* defines the area surrounding Building 84 as a high-density residential reuse area (SWA Group 2000). Additionally, Building 84A is located immediately adjacent to the west side of Building 84 on Petaluma Avenue. Building 84A was constructed in 1939 and was used as a warehouse and print shop (SSPORTS 1997). The planned reuse of the area around Building 84A, which is currently vacant, is also defined as a high-density residential reuse area (SWA Group 2000). Building 84 contains PCB site AL#01, which includes an area on the concrete floor inside the building. Building 84A also has one PCB site (PCB Site Building 84A UL#01), which is a stain-specific location on the concrete/tile floor inside of the building.

Remedial actions at PCB Site Building 84A UL#01 were completed in 2004 and included the removal of the concrete floor in an area approximately 4 by 12 feet. Figure 1 shows the locations of PCB Sites Building 84 AL#01 and Building 84A UL#01. The United States Environmental Protection Agency (USEPA) granted a No Further Action determination for these sites in correspondence dated September 8 and November 17, 2004 (USEPA 2004a-b). DTSC approval of No Further Action at this site is pending final certification of IA D1.3.

Remedial actions for PCBs at Building 84 AL#01 were completed in 2007 and included the removal of the concrete floor in Cells A, B, C, D, E1, E2, and F, as shown in Figure 1. During the PCB removal actions, BGM was observed in 1- to 6-inch layers beneath the entire excavation of Cells B and C, and thinner occurrences were observed in the southwestern portion of Cell F. The BGM was generally observed as a discrete horizontal layer at approximately 1 foot below ground surface (bgs). The BGM consisted of loose, grey to black and/or blackish-brown granular material that appeared to represent furnace slag, coal, and coal-ash material of low density with burned debris. The grain size of the BGM ranged from fine sand to medium-coarse gravel. The BGM was likely used as a leveling course beneath the existing foundation of Building 84. During remedial activities, approximately 50 tons of BGM were excavated, stockpiled, and segregated from other waste streams. One characterization sample was collected from the BGM stockpile and found to contain lead at a concentration of 840 milligrams per kilogram.

CH2M HILL was notified by the laboratory that PCB confirmation samples collected from Cells E exhibited interference in the sample chromatograms, which was interpreted by the laboratory as being indicative of OCPs at 12 sampling locations. The OCP signature was interpreted by the laboratory as technical chlordane, generally considered a mixture of chlordane and other related compounds. Sample location B84AL01CS0925 was

subsequently analyzed for OCPs and laboratory results exhibited detections of alpha-chlordane and gamma-chlordane at concentrations above laboratory reporting limits. As depicted in Figure 1, other OCP-related compounds had estimated detected results. Subsequently, one verification sample from the remediation waste stockpile was collected and analyzed for OCPs. Technical chlordane was detected in the stockpile sample at a concentration of 31 milligrams per kilogram. Other OCP-related compounds were also detected in this sample.

Proposed Soil Sample Locations

CH2M HILL proposes to collect samples from 20 hand-auger locations to evaluate the nature and extent of lead derived from BGM and OCPs in soil around the perimeter of the foundations of Building 84 and 84A. The proposed locations are shown in Figure 1. Each hand-auger location will extend to a planned maximum depth of 4 feet bgs, and two soil samples will be collected from each location; however, this could vary based on the final depth of the hand-auger boring and field observations. It is anticipated that the soil samples will be collected from 1 to 2 feet bgs and 3 to 4 feet bgs; however, this could vary based on field conditions and observations. All soil samples will be submitted for laboratory analysis of OCPs using USEPA Method 8081. Only samples where BGM is visually confirmed will be analyzed for lead using USEPA Method 6020. Based on the observed physical characteristics and generally shallow occurrence of BGM and OCPs observed during previous investigations inside Building 84, CH2M HILL considers the sampling depth of 4 feet bgs to be adequate to evaluate the vertical extent of these target constituents at this site.

Sample locations immediately adjacent to the foundation of Building 84 and Building 84A and the step-out samples located beyond the building foundations will be analyzed for OCPs. Lead will only be analyzed if BGM is encountered and is visually identified at the sample location. Initially, a single, representative sample of BGM will be submitted for lead analysis from each boring location, and any additional BGM samples will be placed on hold pending receipt of the first round of analytical data. Additional samples of BGM may be submitted for laboratory analysis of lead if the physical properties of the material significantly differ to that of the initial sample or if the initial sample result is below screening levels.

Table 1 provides the rationale for the proposed sample locations and corresponding analyses for this investigation.

TABLE 1

Proposed Sample Locations and Analytical Methods

Sampling and Analysis Plan for Investigation of Black Granular Material and Organochlorine Pesticides in Soil at Building 84, Investigation Area D1.3, Lennar Mare Island, Vallejo, California

Proposed Sample	Rationale	Sample Type and Analytical Methods	Sample Depth (feet bgs) ^a
LIB84GB0100	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on southwestern corner of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0101	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on southern corner of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0102	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on eastern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0103	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on the eastern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0104	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on the eastern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0105	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on the eastern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0106	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on the eastern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0107	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM near the northeastern corner of	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually	1 - 2 3 - 4

TABLE 1

Proposed Sample Locations and Analytical Methods

Sampling and Analysis Plan for Investigation of Black Granular Material and Organochlorine Pesticides in Soil at Building 84, Investigation Area D1.3, Lennar Mare Island, Vallejo, California

Proposed Sample	Rationale	Sample Type and Analytical Methods	Sample Depth (feet bgs) ^a
	Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	confirmed.	
LIB84GB0108	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on the northeastern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0109	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM along the northern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0110	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM along the northern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0111	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM near the northwestern corner of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0112	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on northern side of Building 84A. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0113	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on the western side of Building 84A. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0114	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on the south side of Building 84A. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4

TABLE 1

Proposed Sample Locations and Analytical Methods

Sampling and Analysis Plan for Investigation of Black Granular Material and Organochlorine Pesticides in Soil at Building 84, Investigation Area D1.3, Lennar Mare Island, Vallejo, California

Proposed Sample	Rationale	Sample Type and Analytical Methods	Sample Depth (feet bgs) ^a
LIB84GB0115	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM south of the breezeway which connects Building 84A and Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0116	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on southwestern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0117	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on southwestern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0118	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on southwestern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4
LIB84GB0119	Collect one soil sample from two different intervals outside of the buildings footprint to evaluate the lateral extent of OCPs and BGM on southwestern side of Building 84. If BGM is not observed at this location, only analysis for OCPs will be performed.	Soil sample will be analyzed for OCPs (Method 8081); lead analysis (Method 6020) only when BGM is visually confirmed.	1 - 2 3 - 4

Notes:

^a May vary based on field conditions and/or observations.

Sampling Procedures

All sample locations described in Table 1 and presented in Figure 1 are approximate and will be finalized in the field. The final depth and location of each sample will be reported in a technical memorandum following completion of the sampling effort.

All soil sampling will be performed in accordance with the Standard Operating Procedures presented in the *Draft Investigation Area C2 Sampling and Analysis Plan* (CH2M HILL 2002),

previously submitted to the regulatory agencies, as modified based on site-specific conditions.

Analysis

The soil sample will be submitted to the laboratory for the analyses indicated in Table 1. The analytical results will be received in a 21-day turnaround time. A comprehensive list of the analytical methods, reporting limit objectives, and quality assurance and quality control requirements for the sample is provided in the *Quality Assurance Project Plan* (CH2M HILL 2001).

Data Evaluation and Further Investigation

Analytical results for OCPs and lead will be compared to the 2008 USEPA regional screening levels for residential land use (USEPA 2008) and the Tier 2 screening levels for residential soil in the Early Eastern Transfer Parcel (CH2M HILL 2008b). Following completion of this investigation, CH2M HILL will consult with the regulatory agencies on the results of the investigation, conceptual site model, and the need for additional investigations at this site, if any. It is anticipated that any additional investigation will be performed under an addendum to this SAP to ensure specific data quality objectives for investigation and evaluation of OCPs or lead at this site are met.

Schedule

Sampling activities are anticipated to occur in October 2008. Activities are expected to be completed within approximately 3 days. After receipt of analytical data, the data will be validated and evaluated in a technical memorandum to facilitate ongoing discussions with DTSC.

Comments on the Draft SAP were received from the Water Board on September 30, 2008 (Water Board 2008). These comments did not impact the scope of work or the sampling approach and have been addressed with changes incorporated into the Final SAP. The DTSC had no comment on the Draft SAP (DTSC 2008). Based on this information, CH2M HILL is proceeding with the proposed fieldwork as described above.

References

- California Department of Toxic Substances Control (DTSC). 2008. Letter Regarding Lennar Mare Island, SAP Investigation of Black Granular Material and Organochlorine Pesticides in Soil at Building 84 in Investigation Area D1, Dated September 16, 2008. October 9.
- California Regional Water Quality Control Board (Water Board). 2008. *Comments on Sampling and Analysis Plan for Investigation of Black Granular Material and*

Organochlorine Pesticides in Soil at Building 84, Investigation Area D1.3, Lennar Mare Island, Vallejo, dated September 16, 2008. September 30.

CH2M HILL. 2001. *Quality Assurance Project Plan*. November.

_____. 2002. *Draft Investigation Area C2 Sampling and Analysis Plan*. April.

_____. 2003a. *Final Generic Sampling and Analysis Plan for Evaluation of Lead-based Paint and Pesticides in Soil for Mare Island, Vallejo, California*. February 24.

_____. 2003b. *Notification Regarding Self-implementing Onsite Cleanup and Disposal of Polychlorinated Biphenyl Remediation Waste Inside Building 84 in Investigation Area D1.3, Eastern Early Transfer Parcel, Mare Island, Vallejo, California*. October 22.

_____. 2008a. *Sampling and Analysis Plan for Investigation of Black Granular Material and Organochlorine Pesticides in Soil at Building 84, Investigation Area D1.3*. September 16.

_____. 2008b. *Tier 2 Screening Levels for the Eastern Early Transfer Parcel, Mare Island, Vallejo, California*. September 2.

Lennar Mare Island, LLC, the City of Vallejo, and the State of California, Environmental Protection Agency Department of Toxic Substances Control. 2001. *Consent Agreement between Lennar Mare Island, the City of Vallejo, and the State of California, California Environmental Protection Agency Department of Toxic Substances Control*. April 16.

Supervisor of Shipbuilding, Conversion, and Repair, Portsmouth, Virginia, Environmental Detachment (SSPORTS). 1997. *Interim Polychlorinated Biphenyl (PCB) Assessment for Parcel 08-B7*. July 30.

SWA Group. 2000. *Preliminary Land Use Plan*. May 23.

United States Environmental Protection Agency (USEPA). 2004a. Letter Regarding February 27, 2004 Site Characterization and Removal Action for Polychlorinated Biphenyls at Building 84 Located Within Investigation Area D1 in the Eastern Early Transfer Parcel of Mare Island. September 8.

_____. 2004b. Letter Regarding October 28, 2004 Site Characterization and Removal Action Summary Report for Building 84A, Located Within Investigation Area D1 in the Eastern Early Transfer Parcel of Mare Island. November 17.

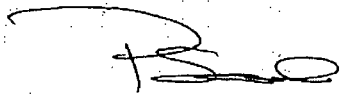
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If you have any questions regarding this document, please contact Paul Scherbak at 415/541-7220 extension 37011.

Sincerely,

CH2M HILL

A handwritten signature in black ink, appearing to read 'P. Scherbak', with a stylized flourish at the end.

Paul D. Scherbak, P.G.
Project Manager

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Enclosure: Figure 1, Attachment 1

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Copy to (with enclosures):

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Attachment 1

Response to Comments on the
**Lennar Mare Island Sampling and Analysis Plan for Investigation of Black Granular Material and
Organochlorine Pesticides in Soil at Building 84 Report,**
dated September 16, 2008
From
California Regional Water Quality Control Board

No.	Section	Pages	Comments	Responses
Paisha Jorgensen, PG September 30, 2008				
Specific Comments				
1.			Please clarify the decision process for analyzing samples for lead. The SAP states that the soil sample will be analyzed for lead if black granular material (BGM) is visually confirmed in the sample. What happens if BGM is visually confirmed in other sections of the core? Will a sample of the BGM be collected for lead analysis?	While BGM has been observed at the Building 84 area as a leveling course, generally confined to a single layer of material beneath paving, CH2M HILL proposes to collect samples of BGM at all observed intervals between 0.0 ft and 4.0 ft bgs at each of the proposed boring locations. Initially, a single, representative sample of BGM will be submitted for lead analysis from each boring location, and any additional BGM samples will be placed on hold pending receipt of the first round of analytical data. Additional samples of BGM may be submitted for laboratory analysis of lead if the physical properties of the material significantly differ to that of the initial sample or if the initial sample result is below screening levels.
2.			It is stated that the analytical results will be compared to the 2008 USEPA regional screening levels for residential soil and the Tier 2 screening levels for residential soil (Tier 2 screening levels have not received concurrence from the Water Board). The screening levels from these two sources differ for individual constituents. Please provide further clarification of the process that will be used to evaluate the data from this investigation.	Samples analyzed for lead and/or OCPs will be compared to both the USEPA regional screening levels and the Tier 2 screening levels for residential soil in the Eastern Early Transfer Parcel. Using both screening levels will provide appropriate comparisons of actionable levels of OCPs and lead in soil at residential sites; however, the requirement for additional investigation or cleanup at the site will be contingent on compounds that exceed the USEPA regional screening levels.
3.			The Tier 2 screening levels are referenced in the text, and included in the references, as being published by the Water Board in May 2008. The Water Board has not published a Tier 2 screening level document.	The text and reference information will be corrected to cite the source of the Tier 2 screening levels as the <i>Tier 2 Screening Levels for the Eastern Early Transfer Parcel, Mare Island, Vallejo, California</i> (CH2M HILL 2008).

CH2M HILL. 2008. *Tier 2 Screening Levels for the Eastern Early Transfer Parcel, Mare Island, Vallejo, California*. September 2.